Eco-Quandary: What Killed the Skuas?

A flap over the disappearance of Antarctic birds suggests blame shouldn't be fixed too quickly after an eco-catastrophe

AFTER EVERY BIG ECOLOGICAL DISASTER—such as the *Exxon Valdez* fouling miles of pristine Alaska coast—comes the finger-pointing. A lot of time is spent trying to assign blame for wildlife being wiped out. And in many cases blame is deserved. Yet some ecological cataclysms make clear that it's important to understand biological systems in all their complexity before fingers begin to wag. A case in point: the skua.

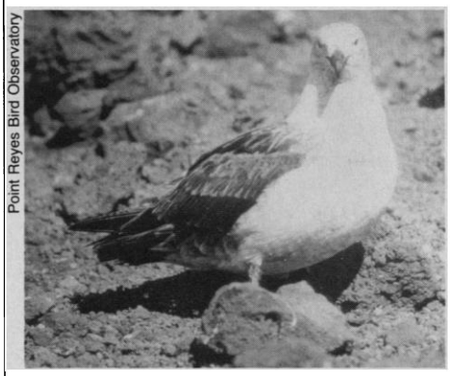
When the Argentine supply ship *Bahia Paraiso* ran aground in January 1989, dumping 250,000 gallons of diesel fuel into pristine Antarctic waters, newspapers and even scientific journals focused on the most dramatic symbol of environmental damage, the death of all the South Polar skua chicks in nearby breeding colonies. What most observers who followed the accounts of the skua deaths in the press had no way of knowing is that massive chick die-offs such as the one that occurred after the oil spill are a matter of course for these gull-like birds.

In fact, two California research teams have recently squared off over the question of whether oil played any role at all in the 1989 skua breeding disaster. One team, from the University of California at Irvine, insists oil did play a key role. But they have been challenged by another team with more experience studying skuas, who argue that the chicks would have died whether the oil had been spilled or not.

"In this case, I think the oil got a bum rap," says Wayne Trivelpiece of Point Reyes Bird Observatory in Stinson Beach, California. Trivelpiece and his colleagues see plenty of evidence that the skua chicks born in the 1988–89 breeding season were already doomed and little reason to conclude that the oil spill hastened their decline. But that hasn't swayed UC Irvine graduate students Zoe Eppley and Margaret Rubega, who insist that the striking pattern of death points to oil as the culprit.

Both groups agree on at least one thing: skuas do go through periodic die-offs of their young. Breeding success in any given season is governed largely by the abundance of the skua's main food source: Antarctic silverfish. When fish are scarce, the birds may not breed at all, or the whole colony may lose its chicks in a spectacular crash. During the failures, some chicks starve, and others, left alone while their parents search for food, are eaten by neighboring skuas.

But even if breeding failures among skuas are common, it is still possible that the oil spill was the trigger for the 1989 crash. In a letter to *Nature* last August (17 August, p. 513), Eppley and Rubega concluded that it was. They had begun studying the skuas during the 1988–89 breeding season at Palmer Station. Before the spill, they had been surveying 54 nests, recording parental attendance and weighing the chicks to track their growth. After the spill, Rubega says, there was a "fairly abrupt" drop in nest attendance by parent birds and a corresponding increase in chick deaths.



Birdlike appetite. *Was the recent "crash" among South Polar skuas, like this one, due to a food shortage—or to an oil spill?*

The Irvine students say they ruled out food shortage as the cause of parental neglect because their growth curves showed the chicks were growing normally until they died. Such a pattern, they say, does not reflect the serious lack of food needed to cause parents to leave their chicks alone while they intensify their fishing efforts. Instead, Eppley and Rubega blame the oil spill for the parental neglect. They saw adult birds diving through the oil slick and getting coated with diesel fuel, yet saw no oily birds at the nests. But some of the oiled birds must have been parents, they reason, and the time required for them to clean off must have extended their absence from the nests.

Eppley and Rubega's findings haven't convinced Trivelpiece and his Point Reyes colleagues. In a riposte in the scientific correspondence section of *Nature*, they replied that a drop in nest attendance such as the one reported by the Irvine team is normal as the chicks get older (17 May, p. 211). This is particularly true, Trivelpiece says, when food is scarce, as the Point Reyes team claims it was in 1988–89.

At the time of the spill, the Point Reyes team was studying a South Polar skua population they had followed for 10 years on King George Island. That site, 500 kilometers from Palmer Station where Eppley and Rubega were working, was unaffected by the oil spill. Yet the King George breeding site also lost all its chicks; this suggests to the Point Reyes team that a regional silverfish shortage may have been responsible.

Trivelpiece says the strongest evidence for a food shortage lies in data collected by the Irvine group themselves—the chick growth curves—which are in press in the *Marine Ecological Progress Series*. He examined the unpublished data and compared them to his team's growth data from six successful breeding seasons at King George Island. "The lowest, lightest bird in any of our years, in any age group, is heavier than twice the standard deviation of their best bird. By 21 days, their birds are 600 grams and ours are 1100. They're obviously starving."

"These [growth rates] were among the lowest that have been reported," Eppley admits. But she says similar growth curves have been recorded at Palmer Station for chicks that survived. "I'm certain these chicks didn't starve to death," she insists. The crux of their data, Eppley says, is the pattern of chick mortality, which jumped by 400% after the spill. Chicks of all age classes died, and all were dead within 3 weeks—a strikingly different pattern, she says, from die-offs caused by food shortages.

William Fraser, a member of the Point Reyes group, says the different die-off patterns are most likely due to the weather. When food is already in short supply, chicks die in greatest numbers during storms. And in 1989, the weather was mild until about 8 days after the oil spill, when a storm arrived. The chicks at both King George Island and Palmer Station died out during that storm, Fraser says. But Eppley says most of the chick deaths she observed had already occurred before the bad weather set in.

Until more data from both sides is available, neither is likely to budge. But for science generally, the most important outcome of the debate may not be the answer to who is right, but rather a more broad-ranging note of caution: Even in the face of blatant environmental insult, cause and effect may not be as simple as they seem.

■ MARCIA BARINAGA